

## Water Quality Standards Query Examples:

Idaho's water quality standards, AKA the rules, are codified in IDAPA 58.01.02 and are formally known as "Water Quality Standards and Wastewater Treatment Requirements".

This query example presents two kinds of questions that can be asked about specific water quality standards:

### 1) Questions that are parameter and use specific, for example:

What is the dissolved oxygen criterion for cold water aquatic life?

Such a question requires at least some prior knowledge of the content of Idaho's water quality rules, i.e. that we have a cold water use, that there are dissolved oxygen criteria.

Cold water is a subcategory of aquatic life. Use-specific water quality criteria for aquatic life use designations are found in section 250 "Surface Water Quality Criteria for Aquatic Life Use Designations" of the rules. The criteria specific to the cold water subcategory of aquatic life use are found in subsection 02. Paragraph a. gives the dissolved oxygen criteria.

**a.** Dissolved Oxygen Concentrations exceeding six (6) mg/l at all times. In lakes and reservoirs this standard does not apply to: (7-1-93)

**i.** The bottom twenty percent (20%) of water depth in natural lakes and reservoirs where depths are thirty-five (35) meters or less. (7-1-93)

**ii.** The bottom seven (7) meters of water depth in natural lakes and reservoirs where depths are greater than thirty-five (35) meters. (7-1-93)

**iii.** Those waters of the hypolimnion in stratified lakes and reservoirs. (7-1-93)

### 2) Questions that are parameter and waterbody specific, for example:

What are the bacteria criteria for Jordan Creek?

To get to the criteria one must first determine the use (designated or presumed) for Jordan Creek. Once that is determined, you can follow the same process set forth above.

Idaho's use designations are by water body units, AKA WBIDs. These are tabulated by hydrologic units in sections 110, 120, 130, 140, 150, and 160 of the rules, one section for each of Idaho's six hydrologic basins. Section 109 provides a map of the basins and subbasins; a table that cross-references eight digit hydrologic unit codes, with subbasin names and subsections of the rules; and use abbreviations used, e.g. PCR – Primary Contact Recreation.

Still, some knowledge of the geography of Idaho and where Jordan Creek is located is necessary in order to avoid a line-by-line search of the tables. Jordan Creek is in the Jordan subbasin, hydrologic unit code 17050108, and its use designations can be found in rule subsection 140.08.

Consulting subsection 140.08 reveals that Jordan Creek is listed twice, meaning that it consists of two waterbody units. In this case the use designations are the same for both units, so no additional knowledge is needed. (If the uses differ by waterbody unit, it is necessary to figure out which unit your place of interest is on, if not the entire unit.) In our example the use designations are cold water aquatic life, salmonid spawning (a subcategory of CWAL), primary contact recreation, and special resource water.

Like question one, some prior knowledge of the content of Idaho's water quality rules is useful: e.g. bacteria criteria are specified only for recreation use. Knowing this we can now proceed to Section 251 "Surface Water Quality Criteria for Recreation Use Designations" of the rules. The criteria specific to the primary contact subcategory of recreation use are found in subsection 01 (note: the only use-specific bacteria criteria in the IDWQS are specified here for recreation)

**01. Primary Contact Recreation.** Waters designated for primary contact recreation are not to contain E.coli bacteria significant to the public health in concentrations exceeding: (4-5-00)

a. For areas within waters designated for primary contact recreation that are additionally specified as public swimming beaches, a single sample of two hundred thirty-five (235) E. coli organisms per one hundred (100) ml. For the purpose of this subsection, "specified public swimming beaches" are considered to be indicated by features such as signs, swimming docks, diving boards, slides, or the like, boater exclusion zones, map legends, collection of a fee for beach use, or any other unambiguous invitation to public swimming. Privately owned swimming docks or the like which are not open to the general public are not included in this definition. (3-15-02)

b. For all other waters designated for primary contact recreation, a single sample of four hundred six (406) E.coli organisms per one hundred (100) ml; or (3-15-02)

c. A geometric mean of one hundred twenty-six (126) E.coli organisms per one hundred (100) ml based on a minimum of five (5) samples taken every three (3) to five (5) days over a thirty (30) day period. (4-5-00)

We also need to know if the specific place of interest on Jordan Creek is a public swimming beach to get our final answer. [Note: As written, there is only the single sample value of 235 E. coli organisms for public swimming beaches. Modification is needed to this section – an/or should be added to include the 30-day, 5 sample geometric mean of 126 E. coli as well.]

If we were interested in the bacteria criteria for cold water aquatic life we would follow our trail to find there are none. Bacteria criteria were developed to protect human health and are not appropriate to other uses.

A final note: Section 251 can mislead one to think there are only bacteria criteria applicable to recreation uses. This is not so. Column C2 numeric criteria for toxic substances in section 210 apply to waters designated (or presumed) to support recreation.

A person might also ask a more general question, such as – What are the criteria to support salmonid spawning? There is no simple or single answer to such a question as there are several criteria that apply to salmonid spawning.

First of all there are dissolved oxygen criteria (both for intergravel and water-column) and temperature criteria that are specific to waters designated for salmonid spawning.

- f. Salmonid spawning: waters designated for salmonid spawning are to exhibit the following characteristics during the spawning period and incubation for the particular species inhabiting those waters: (7-1-93)
  - i. Dissolved Oxygen. (8-24-94)
    - (1) Intergravel Dissolved Oxygen. (8-24-94)
      - (a) One (1) day minimum of not less than five point zero (5.0) mg/l. (8-24-94)
      - (b) Seven (7) day average mean of not less than six point zero (6.0) mg/l. (8-24-94)
    - (2) Water-Column Dissolved Oxygen. (8-24-94)
      - (a) One (1) day minimum of not less than six point zero (6.0) mg/l or ninety percent (90%) of saturation, whichever is greater. (8-24-94)

Secondly, salmonid spawning (SS) is a subcategory of cold water aquatic life (CWAL). So, in additions to the above, the ammonia and turbidity criteria for CWAL apply as well to SS.

Thirdly, CWAL is a subcategory of aquatic life, so the general criteria for pH and total dissolved gas apply to SS, as they do to all subcategories of aquatic life. Also, the column B numeric criteria for toxic substances in section 210 apply to waters designated (or presumed) to support aquatic life. Thus these toxics criteria apply to all subcategories of aquatic life, e.g. CWAL, which in turn includes SS.

Finally the “General Surface Water Quality Criteria” in section 200 of the rules, the narrative criteria apply to SS, as they do for all surface waters regardless of specific use designations.

It should not be forgotten that the ammonia criteria and several of the metals criteria are really equations, so the water quality criterion applicable to your water body of interest depends on additional information to feed the equations. In the case of ammonia both temperature and pH are needed. For Cd, Cr (III), Cu, Pb, Ni, Ag, and Zn the hardness of the water is needed as toxicity of these metals is related to hardness. For these parameters though you will find an number given in the water quality standards, they are example criteria for a harness of 100 mg/L and a water effect ratio of 1.0 but in all probability are not the values for appropriate for your water.